

THE STRATEGIC MOBILITY SHORTFALL: UNDERREPRESENTED, UNDERFUNDED AND UNRESOLVED

A Monograph
By
Lieutenant Colonel Ann K. Drach
Transportation Corps



19951024 137

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

AY 94-95

Approved for Public Release; Distribution is Unlimited

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 19 May 95	3. REPORT TYPE AND DATES COVERED Monograph		
4. TITLE AND SUBTITLE The Strategic Mobility Shortfall -- Underrepresented, Underfunded, and Unresolved		5. FUNDING NUMBERS		
6. AUTHOR(S) LT COL ANN K. DRACH				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) SAMS, CGSC		8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) CGSC		10. SPONSORING / MONITORING AGENCY REPORT NUMBER		
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Unlimited		12b. DISTRIBUTION CODE APPROVED FOR PUBLIC RELEASE. DISTRIBUTION UNLIMITED.		
13. ABSTRACT (Maximum 200 words) See Attached <div data-bbox="360 1499 722 1772" data-label="Image"> </div>				
14. SUBJECT TERMS		15. NUMBER OF PAGES 58		
		16. PRICE CODE		
17. SECURITY CLASSIFICATION OF REPORT UNCLAS	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLAS	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLAS	20. LIMITATION OF ABSTRACT Unlimited	

GENERAL INSTRUCTIONS FOR COMPLETING SF 298

The Report Documentation Page (RDP) is used in announcing and cataloging reports. It is important that this information be consistent with the rest of the report, particularly the cover and title page. Instructions for filling in each block of the form follow. It is important to *stay within the lines* to meet *optical scanning requirements*.

Block 1. Agency Use Only (Leave blank).

Block 2. Report Date. Full publication date including day, month, and year, if available (e.g. 1 Jan 88). Must cite at least the year.

Block 3. Type of Report and Dates Covered. State whether report is interim, final, etc. If applicable, enter inclusive report dates (e.g. 10 Jun 87 - 30 Jun 88).

Block 4. Title and Subtitle. A title is taken from the part of the report that provides the most meaningful and complete information. When a report is prepared in more than one volume, repeat the primary title, add volume number, and include subtitle for the specific volume. On classified documents enter the title classification in parentheses.

Block 5. Funding Numbers. To include contract and grant numbers; may include program element number(s), project number(s), task number(s), and work unit number(s). Use the following labels:

C - Contract	PR - Project
G - Grant	TA - Task
PE - Program Element	WU - Work Unit Accession No.

Block 6. Author(s). Name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. If editor or compiler, this should follow the name(s).

Block 7. Performing Organization Name(s) and Address(es). Self-explanatory.

Block 8. Performing Organization Report Number. Enter the unique alphanumeric report number(s) assigned by the organization performing the report.

Block 9. Sponsoring/Monitoring Agency Name(s) and Address(es). Self-explanatory.

Block 10. Sponsoring/Monitoring Agency Report Number. (If known)

Block 11. Supplementary Notes. Enter information not included elsewhere such as: Prepared in cooperation with...; Trans. of...; To be published in.... When a report is revised, include a statement whether the new report supersedes or supplements the older report.

Block 12a. Distribution/Availability Statement. Denotes public availability or limitations. Cite any availability to the public. Enter additional limitations or special markings in all capitals (e.g. NOFORN, REL, ITAR).

DOD - See DoDD 5230.24, "Distribution Statements on Technical Documents."

DOE - See authorities.

NASA - See Handbook NHB 2200.2.

NTIS - Leave blank.

Block 12b. Distribution Code.

DOD - Leave blank.

DOE - Enter DOE distribution categories from the Standard Distribution for Unclassified Scientific and Technical Reports.

NASA - Leave blank.

NTIS - Leave blank.

Block 13. Abstract. Include a brief (*Maximum 200 words*) factual summary of the most significant information contained in the report.

Block 14. Subject Terms. Keywords or phrases identifying major subjects in the report.

Block 15. Number of Pages. Enter the total number of pages.

Block 16. Price Code. Enter appropriate price code (*NTIS only*).

Blocks 17. - 19. Security Classifications. Self-explanatory. Enter U.S. Security Classification in accordance with U.S. Security Regulations (i.e., UNCLASSIFIED). If form contains classified information, stamp classification on the top and bottom of the page.

Block 20. Limitation of Abstract. This block must be completed to assign a limitation to the abstract. Enter either UL (unlimited) or SAR (same as report). An entry in this block is necessary if the abstract is to be limited. If blank, the abstract is assumed to be unlimited.

ABSTRACT

"The Strategic Mobility Shortfall: Underrepresented, Underfunded, and Unresolved," by Lieutenant Colonel Ann K. Drach, Transportation Corps, 43 pages.

This monograph reviews the highly successful U.S. deployment to Operation Desert Storm, explores current strategic mobility initiatives, and critically examines ongoing initiatives to eliminate strategic lift shortfalls. It includes a comparison of the 1992 Mobility Requirements Study and the 1994 Bottom Up Review and their implications for ongoing strategic lift acquisition programs.

The monograph evaluates the three strategic mobility pillars--airlift, sealift, and prepositioning. Additionally, the author adds a fourth pillar, infrastructure, to the analysis in the belief that infrastructure plays an underrepresented and vital role in force projection. The focus is on whether or not each of these pillars can fulfill its strategic lift missions in light of the current national security strategy and the increased, Post Cold War demands being placed on the nation's strategic lift assets.

The author looks at alternative acquisition strategies in light of the cost prohibitive programs currently in effect. Special emphasis is placed on the C-17 Program which has experienced delays and cost overruns sufficient to curtail its acquisition from the required 120 aircraft to a total buy of 40.

Finally, the author proposes several new approaches, including; burden sharing with allies, more prepositioning, development of a new automated transportation management and tracking system, trading combat systems for projection assets, and more commercial industry involvement at the highest national level.

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

Lieutenant Colonel Ann K. Drach

Title of Monograph: The Strategic Mobility Shortfall--
Underrepresented, Underfunded and
Unresolved

Approved by:



Robert H. Berlin, Ph.D.

Monograph Director



COL Danny M. Davis, MA, MMAS

Director, School of
Advanced Military
Studies



Philip J. Brookes, Ph.D.

Director, Graduate
Degree Program

Accepted this 19th Day of May 1995

Accession For	
NTIS CRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

ABSTRACT

"The Strategic Mobility Shortfall: Underrepresented, Underfunded, and Unresolved," by Lieutenant Colonel Ann K. Drach, Transportation Corps, 43 pages.

This monograph reviews the highly successful U.S. deployment to Operation Desert Storm, explores current strategic mobility initiatives, and critically examines ongoing initiatives to eliminate strategic lift shortfalls. It includes a comparison of the 1992 Mobility Requirements Study and the 1994 Bottom Up Review and their implications for ongoing strategic lift acquisition programs.

The monograph evaluates the three strategic mobility pillars--airlift, sealift, and prepositioning. Additionally, the author adds a fourth pillar, infrastructure, to the analysis in the belief that infrastructure plays an underrepresented and vital role in force projection. The focus is on whether or not each of these pillars can fulfill its strategic lift missions in light of the current national security strategy and the increased, Post Cold War demands being placed on the nation's strategic lift assets.

The author looks at alternative acquisition strategies in light of the cost prohibitive programs currently in effect. Special emphasis is placed on the C-17 Program which has experienced delays and cost overruns sufficient to curtail its acquisition from the required 120 aircraft to a total buy of 40.

Finally, the author proposes several new approaches, including, burden sharing with allies, more prepositioning, development of a new automated transportation management and tracking system, trading combat systems for projection assets, and more commercial industry involvement at the highest national level.

TABLE OF CONTENTS

	Page
Introduction	1
Background	5
Genesis--Operation Desert Storm	10
The Strategic Mobility Pillars	16
--The First Pillar--Airlift	18
--The Second Pillar--Sealift	25
--The Third Pillar--Prepositioning	31
--The Fourth Pillar--Infrastructure	34
Conclusions and Implications	37
Endnotes	45
Bibliography	52

INTRODUCTION

The global security environment has changed dramatically since the 1980s when the Cold War ended. The move from a bipolar world to one with a less threatening environment has allowed the United States to substantially reduce its Armed Forces. The Cold War threat diminished and so has the rationale for large, forward-based forces. As a result, the United States is reducing its military presence around the world. This military reduction, however, is not being accomplished in concert with a reduced global leadership role. As Paul Johnson, a political analyst, wrote recently in Foreign Affairs:

Except for those few isolationist-ridden years in the 1930s, there has never been any substantial argument about whether or not the United States "would choose to play a continuing role in world affairs." It has to; it wants to; it intends to. The likelihood of Clinton's America, or any other America, shrinking into an isolationist posture is nil...Like it or not, America will continue to be the world's reluctant sheriff, sometimes arriving late, but always getting there.¹

Not only will the United States go, it must cross oceans to get there. The United States is a maritime nation with global reach. Its strategic advantage is that it can wage war globally, applying the leverage of military intervention at the time and place of its choosing. As General Carl E. Mundy, Jr., Marine Corps Commandant, stated, "American diplomacy has faithfully reflected this enormous leverage...since the War of 1812, we have successfully maintained as a fundamental tenet of national defense that enemies should be fought on the far side of the oceans."² The drawdown of forward-based forces by 40 percent since the

end of the Cold War has caused the National Command Authority (NCA) to reconsider how it will keep the Nation militarily engaged on the oceans' far sides with smaller, Continental United States (CONUS)-based Armed Forces.³

Though the world is less dangerous to U.S. vital interests, the Nation is still confronted with a diverse array of political, military, and economic challenges as it affirms its role as world leader. Searching for a new national security approach which acknowledges a lesser threat, but which assures allies of continued U.S. commitment, is the dilemma confronting the Nation as it reduces its military investment.⁴ The National Security Strategy, published in July 1994, establishes the parameters for that military engagement. It states that the United States must deploy robust and flexible forces that can accomplish a variety of tasks, including providing a credible overseas presence and contributing to multinational peace operations. In fulfilling these tasks, the strategy states that the Armed Forces may be directed to simultaneously project and sustain forces in more than one region.⁵

The Department of Defense (DOD) has been required to develop a new approach in order to fulfill these national security objectives. There will be 30 percent fewer forces in Fiscal Year (FY) 1999 than there were in FY 1988 and they will operate on 40 percent fewer dollars. Yet, in spite of this drawdown, in the past year U.S. forces have participated in more operations for a longer duration than any time in the past 20 years. These operations have involved 25 percent of the entire force and most were strategically deployed from bases in CONUS or Europe. DOD's approach for conducting these operations is called "power

projection." It consists of the ability to arrive quickly, conduct extended operations, configure forces as required, and deploy them efficiently and effectively.⁶

The U.S. Transportation Command (USTRANSCOM) has practiced this new force projection philosophy repeatedly during the past year--Air Mobility Command (AMC) flew the equivalent of five Berlin Airlifts during FY 1994. Whether for humanitarian operations, such as delivering relief supplies to Rwanda and Cuban migrant support, or to deploy forces to Haiti and Kuwait in response to military threats, the complexity and volume of these strategic-lift power projections generated more missions in a shorter period of time than the United States has experienced since World War II. At various times during the past 18 months, there were six joint task forces (JTF) deployed around the globe, consuming airlift.⁷

The strategic mobility challenge for military planners is obvious. The ability of the United States to project large forces to multiple regional contingencies is predicated on a robust strategic mobility capability comprised of airlift, sealift, prepositioning and transportation infrastructure. All four components of strategic mobility must be blended in the proper balance to ensure that the United States possesses the strategic agility to apply military forces at the time and place of its choosing. Since the end of the Cold War there has been continuous debate over how much lift is enough. This study reviews the highly successful U.S. deployment to Operation Desert Storm (ODS), explores current strategic mobility

capabilities and doctrine, and critically examines ongoing initiatives to eliminate strategic lift shortfalls. Finally, alternatives and recommendations are presented to facilitate successful future force projection operations.

BACKGROUND

In 1991, Congress directed DOD to determine strategic mobility requirements in order to guide the development of a lift acquisition program through the year 2000. As a result, the JCS published the Mobility Requirements Study (MRS) in January 1992. The MRS succinctly quantified DOD's lift requirements and made a formal recommendation on strategic mobility enhancements to ensure a deployable, 1999 base-line force. The study was comprehensive; it considered threats, warning time, allies, overseas bases with port access, availability of commercial shipping and a projection of civil maritime capabilities, likely DOD budgets, and lessons learned from ODS. The Study used scenario-specific simulations and incorporated a thorough analysis of arrival times, as well as escalating risks associated with progressively later force closure dates.⁸

The MRS is a highly respected document and has become the template for current lift and preposition acquisition programs. Unfortunately, it was accomplished as a result of ODS and, consequently, used one base-line force lifted to one major contingency operation as its model. It did not, and could not, envision a near term, major shift in national security strategy which would dictate a requirement to provide forces to two, nearly simultaneous MRCs, separated by vast operating distances--specifically Korea and Southwest Asia (SWA).⁹

This shift in requirements set forth in the 1994 national security strategy was first analyzed for feasibility in the Bottom Up Review (BUR). Initiated in March

1993, by then Secretary of Defense, Les Aspin, the purpose of the BUR was to review DOD infrastructure, strategy, force structure, modernization, and foundations. Changes in the international security environment, the report states, had fundamentally altered security requirements. According to Mr. Aspin:

Our analysis showed that we can maintain a capability to fight and win two major regional conflicts and still make prudent reductions in our overall force structure--so long as we implement a series of critical force enhancements to improve our strategic mobility and strengthen our early-arriving antiarmor capability, and take other steps to ensure our ability to halt regional aggression quickly.¹⁰

The BUR Report, published in October 1993, identified a force package for each MRC consisting of: 4-5 Army divisions; 4-5 Marine expeditionary brigades (MEB); 10 Air Force fighter wings; 100 Air Force heavy bombers; 4-5 Navy aircraft carrier groups; and various special forces units.¹¹ In order to provide the forces required to fight two MRCs, in addition to ongoing peacekeeping and other OOTW missions, the United States will be required to conduct rapid mobilization of its entire active force structure, as well as the reserve component forces which support them during major deployments. The BUR does caution that in order to do this, strategic lift and prepositioning must be enhanced and that specialized, high-leverage forces may be "dual tasked."¹²

In essence, the BUR, which formed the foundation for the President's national security strategy, undercut the principle assumption set forth in the MRS--that is, the deployment of one major force package to one theater of operations. Unfortunately, the BUR was not as precise an analytical tool as was the MRS and could not identify the revised strategic lift shortfall. It simply stated that "our plans

call for substantial enhancements to our strategic mobility--most of which were first identified in the MRS.”¹³

The implications of the BUR's ambiguous phrasing have been the cause of vigorous national debate between DOD, Congress and the Government Accounting Office (GAO) over what constitutes “substantial enhancement.” Though the MRS is being revised in light of the BUR findings, lift acquisition programs can take as long as 30 years, as in the case of the C-17 airlifter. Equipment leasing and procurement of off-the-shelf aircraft and vessels can take seven to ten years, as in the case of the roll on/roll off (RORO) sealift acquisition program.¹⁴

Perhaps more important is the apparent growing belief among military leaders and analysts that a two-MRC strategy cannot be executed and may not be needed. During a conference held at West Point in the Spring of 1994 on “Views on the 1995-2010 Period,” comments made about the BUR by a number of government officials, members of the media, and others included:

- The BUR was meant to be a 10-year or longer profile of force needs.
- No one believes the BUR can perform two MRCs.
- No room for friction or misinformation.
- It assumes the U.S. would withhold forces from one MRC in anticipation of the second one (even as U.S. losses occur).

- The U.S. will need forces for more than one, but less than two, MRCs.¹⁵

Senator John McCain, of Arizona, commissioned a report, co-authored by General (Ret.) Charles A. Gabriel, USAF, General (Ret.) Robert Riscassi, USA, General (Ret.) Alfred M. Gray, USMC, and Admiral (Ret.) Carlisle A.H. Trost, USN, to review the current state of military readiness. This 1995 report concludes that the Army and the Air Force are too small to fulfill a two MRC strategy. The report says that the BUR relied on faulty assumptions about the deployability of Army divisions stationed in Europe and Korea and the speed with which "enhanced readiness" National Guard brigades can be made ready for war.¹⁶

In his annual report to Congress, General Robert Rutherford, Commander in Chief (CINC), USTRANSCOM, told the Senate Armed Services Committee on February 23, 1995 that the DOD needs 11 more years to fix the airlift shortfall required to support two MRCs. He testified that the C-17 and the possible purchase of wide-bodied aircraft must continue on schedule to meet the airlift demands imposed by the current warfighting CINCs' operations plans (OPLANS).¹⁷ General Rutherford's caution to Congress about the C-17 is warranted. The C-17 program is currently on probation because it is behind production and plagued by cost overruns. The required number of aircraft was originally programmed at 210, a figure which was pared down to 120 in 1990 as a result of the end of the Cold War and validation by MRS. Congress will decide in

the Fall of 1995 whether or not to further limit production to 40 aircraft, because of the rapidly escalating purchase price.¹⁸

According to General Rutherford, sealift is not in much better shape, though acquisition programs for enhancement are still on track. He told the Committee that deployment to two, nearly-simultaneous MRCs requires 10 million square feet of cargo space. There is currently 6.5 million square feet available to DOD. The military is in the process of buying 18 more RORO ships to mitigate the shortage; however, this acquisition program will not be completed until 2001. After these ROROs join the inventory there will still be a shortfall of eight RORO-type vessels for maritime prepositioning.¹⁹

Fulfillment of the National Security Strategy requires the execution of an ambitious airlift and sealift acquisition program. The purpose of this paper is to examine the strategy in view of the strategic lift shortfall and the resources required to eliminate it. A second purpose is to explore whether or not there are alternatives to the current strategic mobility model which would give the United States a more cost effective method of executing the current strategy.

GENESIS--OPERATION DESERT STORM

The current emphasis on strategic mobility within the DOD finds its origins in Operation Desert Storm (ODS). Critical analysis of deployment, sustainment, and redeployment operations during the Gulf War led to many lessons for strategic mobility planners. The rapidity with which the United States responded to Saddam Hussein's attack on Kuwait in August 1991 had no precedent in U.S. military history. During the first 30 days of ODS the United States discharged and processed 38,000 troops and 163,581 tons of equipment for onward movement in SWA. The number of troops and tons of equipment that were deployed to SWA during the early days of the war is equally impressive. Given the enormous deployment distances and the lack of established United States presence in the Region, the United States executed a remarkable response.²⁰

Unlike previous major conflicts, a large percentage of equipment was shipped by air. Strategic lift planning factors are normally computed as predominantly airlift requirements (95 percent versus 5 percent by sea), until the sea lines of communication (SLOC) can be established, which is generally planned for 30 days after the first strategic movement takes place (C Day). At C+30, the mix is envisioned to reverse as the SLOCs open and 95 percent of the lift is by sea and 5 percent is by air. This transition never fully occurred during ODS. Airlift accounted for 15 percent of all the strategic lift throughout the war. More important, 30 percent of the resupplies moved by air.²¹ The increased ratio of

airlift to sealift should be considered a permanent trend. Airlift has assumed an increasingly important role in meeting the NCA's force deployment time lines for effective contingency response. Additionally, the disproportionately high percentage of resupply by airlift can be attributed to a shift in the complexion of resupplies from general supplies to Class IX repair parts which are often shipped via air when they are required for deadlined combat systems. The United States fights on a high technology, hardware-intensive battlefield. Future battlefields will generate an even greater demand for fast moving repair parts which will rely on cargo aircraft for timely delivery.

The increased demand for cargo aircraft is mirrored in troop air movement requirements. During the past four major conflicts, there has been an irreversible trend toward movement of troops by air. Most notable are the figures contrasting the Vietnam War and ODS. During the Vietnam War, 82,800 troops were sealifted to the theater in the first 90 days of the war, while 85,562 troops deployed by air. In ODS, during the same time frame, 1,453 troops were sealifted and 183,030 troops were airlifted. This trend can, to some degree, be attributed to the fact that the United States strategy calls for rapid strategic response, but the primary reason for this shift in deployment philosophy is due to the Civil Reserve Air Fleet (CRAF). The CRAF serves as a mechanism for DOD to tap into the prodigious commercial air passenger capability of the United States. Activated during ODS for the first time since its inception in 1951, the CRAF flew 5500 missions for USTRANSCOM between August 17, 1990 and May 24, 1991.²²

In conjunction with the increased demand of airlift, Lieutenant General William G. Pagonis, the senior logistics commander in the SWA theater during ODS stated in his book on the war, Moving Mountains, "...it is clear to all of us who were involved in the Gulf War that the United States needs to augment its fast-sealift capability...we must ensure that we can move our troops and equipment across the oceans." ²³ Another major lesson of ODS is that not only will there be an increased reliance on airlift, but that ocean shipping distances must now be calculated in terms of the two MRCs, more than twice the distance demanded of sealift during the Cold War. Current commitments may extend the SLOCs to as much as 8,000 to 10,000 miles. In order to meet the demands of extended operating distances, fast-sealift shipping (speeds in the vicinity of 25 knots) is required.

The 1991 U.S. Maritime Administration (MARAD) Annual Report cautioned that the following, tenuous, conditions for rapid sealift during ODS, while guaranteeing success in that war, should not be assumed in future contingencies:

- The coalition forces controlled the air and shipping lanes.
- There were six months to build a force in theater prior to the ground offensive.
- Access to modern port facilities, no battle damage to shipping infrastructures, and no losses at sea.
- Strong allied support which meant that foreign flag crews and vessels were readily available.

- Shipyards with large drydocks were available in theater.
- Ample supplies of ships' fuel were available in theater.²⁴

The conditions surrounding that success were unique to that operation in that both Saudi Arabia and Kuwait possess large, modern infrastructure with unlimited capacity. One way to mitigate the problems associated with sealift operations to less developed countries in the future is with fast-sealift ships (FSS), because they are high speed, low draft, self-discharging vessels. USTRANSCOM had access to eight FSSs for ODS. In spite of having the world's finest shipping capacity available, those eight FSSs made four round trips to SWA and carried 10% of all the dry cargo requirements to support that war.²⁵

For the first time in a major U.S. deployment, Foreign-flag shipping played a vital role. A total of 22.6 percent of the cargo shipped to SWA went via foreign-flag carriers. The Special Middle East Shipping Agreement (SMESA), which was developed to support the enormous containerized cargo shipping requirement of 2700 containers per week, was made with seven U.S.-flag carriers. However, these containers were shipped to overseas collection points where they were transshipped to SWA via feeder ships, which were often foreign flagged. SMESA accounts for another large portion of foreign flag reliance during ODS and brings the total to near 30 percent.²⁶

Long standing United States policy is to use U.S.-flag carriers to fulfill DOD shipping requirements. Though often not cost effective, self reliance preserves the Nation's ability to respond unilaterally with military forces. Additionally, exclusive

use of U.S.-flag carriers is intended to bolster a decaying, noncompetitive maritime shipping industry. There is tremendous resistance to changing this maritime philosophy; however, an important lesson from ODS was that reliance on allied shipping is a major criterion for deciding whether or not to commit to large scale military operations. Certainly ODS could not have been accomplished without heavy reliance on allies for fuel, port handling and clearance equipment, and unlimited access to port facilities. Building a U.S. maritime fleet to facilitate unilateral military operations may be a moot point, given the coalition support requirements for operating this fleet and discharging its military cargoes.

A final strategic mobility lesson learned from ODS concerns the prepositioning of supplies and equipment. Prepositioning can be accomplished through land basing or maritime stowage. During ODS there were no land-based equipment sets in SWA, thus dramatically slowing the ground force build up. The Maritime Prepositioned Force (MPF), which is comprised of Maritime Prepositioned Squadrons (MPS), were off loading heavy U.S. Marine Corps forces in Saudi Arabia 18 days after notification. The MPS provided outstanding strategic response and was considered a resounding success.²⁷

The development of a land-based equipment set in Kuwait at the end of ODS has a healthy deterrent tremendous effect, as well as providing training equipment and a rapid, strategic response capability should armored forces be needed quickly again in the Region. Equally desirable, Kuwait pays for the maintenance of the equipment set and participates in combined training with U.S. forces as they

conduct training rotations.²⁸ This lesson, as well as the others from ODS, needs renewed emphasis as national decision makers determine the proper strategic mobility profile for the United States.

The MRS was directed by Congress as a result strategic mobility shortfalls associated with ODS. The United States received enormous coalition support in the areas of sealift, airlift, ports, and inland transportation assets; yet, it took six months to build enough forces and infrastructure sufficient for the theater CINC to conduct an offensive ground campaign.²⁹ DOD has several ongoing initiatives in the areas of airlift, sealift, prepositioning, and infrastructure which are working to quantify and eliminate the strategic lift shortfall.

THE STRATEGIC MOBILITY PILLARS

In order to examine strategic mobility requirements, renewed analysis of both current and projected capability, in relationship to the current national security strategy, is required. At a news conference in October, 1994, Deputy Defense Secretary, John Deutch, defended the United States ability to respond to two nearly simultaneous MRCs, in spite of programmed force structure reductions. He acknowledged, however, that, "If there are places of concern to us, they have to do...with strategic mobility and the logistical support to deal with this matter."³⁰

The GAO has taken the position that the strategic mobility shortfall is more serious than DOD acknowledges. In testimony before the House Armed Services Committee on April 26, 1994, Norman Robkin, Associate Director, Military Operations and Capabilities Issues, National Security and Internal Affairs Division, GAO, stated that , in spite of DOD's many initiatives resulting from the MRS, there are several, critical, unresolved issues. In addition to C-17 Program failures, the loss of infrastructure represented in European base closures, an inadequate U.S. rail system for movement of heavy forces to seaports of embarkation (SPOE) and overly pessimistic assumptions about DOD's access to maritime shipping probably generated faulty conclusions and acquisition recommendations in the MRS.³¹

While acknowledging a growing concern over the inability of the aging airlift fleet to meet the demands of an increasing operations tempo, Lieutenant General

Kenneth Wykle, Deputy Commander, USTRANSCOM, has stated that ongoing acquisition programs, as set forth in the MRS, will ensure sufficient strategic mobility capability to meet a two-MRC strategy by the year 2000. In conjunction with the commercial sector and reserve component assets, he feels that USTRANSCOM can also meet its current common-user transportation requirements imposed on it by DOD.³²

That assessment may be short-sighted given the global nature of current force projection operations, coupled with airlift and sealift acquisition program delays. Army Field Manual (FM) 100-17 states that "force projection and sustainment success is based on the strategic mobility triad (airlift, sealift, and prepositioning)." It goes on to say that success is determined by "the balance of prepositioning, sealift, and airlift, coupled with their interconnecting LOCs."³³ In current vernacular, the LOCs and the management of the lift assets moving across them are referred to as infrastructure. As demonstrated by shipping efforts to Rwanda and Somalia in 1994, a lack of adequate infrastructure can cripple strategic mobility operations. Airports and seaports not only have to be considered, they will often dictate the type of plane or ship which can be used. Adequate strategic lift is no longer a simple matter of capacity stated in tonnage. Strategic mobility assets must also possess the flexibility to carry U.S. interests to undeveloped regions. For that reason, infrastructure deserves the same level of consideration as the three modal components of the strategic mobility triad. This analysis,

therefore, will address four pillars of strategic mobility; airlift, sealift, prepositioning, and infrastructure.

The First Pillar--Airlift

DOD divides its strategic lift requirements into three distinct components--initial surge lift, which allows for early arriving combat forces, sustainment lift, which allows for theater build up and the movement of reinforcements, and maritime prepositioning. Strategic airlift provides the means for a rapid response of military forces and is the linchpin of surge operations until fast-sealift shipping closes in theater. Airlift also facilitates entry into undeveloped regions, as long as adequate airfields are available, and is the most flexible of the strategic lift assets. The MRS, which projected one force to one contingency, validated an airlift fleet comprised of 120 C-17s, 100 C-141s, and 105 C-5s.³⁴ Unfortunately, there are several fallacies associated with those numbers. First, between 30 and 40 percent of the C-5 fleet is deadlined for maintenance at any given time. The C-141 fleet is approaching its 30-year, 45,000 hour life span and its replacement aircraft, the C-17, may be curtailed to a total buy of 40 aircraft by Congress prior to the end of FY 1995.³⁵

In his testimony to the Senate Armed Services Committee on February 23, 1995, General Rutherford, CINCUSTRANSCOM, acknowledged these problems and called the military airlift shortfall "critical."³⁶ To highlight how serious this shortfall has become, Air Mobility Command (AMC) at USTRANSCOM, has said

that if it must operate a reduced C-17 fleet of 40 aircraft, in a two-MRC scenario, "it would take 58 days to complete MRC East deliveries and 152 days to finish supplying MRC West, both figures well beyond the moderate risk the Joint Chiefs of Staff had accepted in the 1992 MRS."³⁷

In order to gain a proper appreciation for the current status of military airlift in its relative position to the other strategic mobility pillars, it is necessary to look at the current military airlift fleet and its roles and missions. For the past thirty years, DOD has relied on two workhorse aircraft to provide strategic lift of heavy equipment to locations around the world--the C-141 Starlifter and the C-5 Galaxy. The new C-17 Globemaster, and the KC-135 Stratotanker and the KC-10 Extender, both strategic tankers, currently provide a small amount of cargo support, but the vast majority of AMC's cargo hauling requirements are accomplished by the two aging cargo planes.

During General Rutherford's testimony to Congress in February 1995, he stated that the C-141 is suffering from cracks and corrosion which may force many of the planes into permanent grounding before an adequate number of C-17s can be acquired.³⁸ In spite of extensive maintenance efforts to extend the aircraft's life span, the active C-141 fleet is still programmed for retirement in 2003 and the reserve component aircraft for 2006--nine years earlier than the Air Force originally planned.³⁹ Assuming the C-17 passes its probation period, it will take the Air Force until 2006 to buy enough C-17s and possibly wide-bodied,

commercial aircraft to increase the airlift fleet to meet mission and contingency requirements.⁴⁰

The current military airlift fleet contains 118 C-5s and 226 C-141s. An operational profile for the C-141 in February 1994 provided by the then CINCUSTRANSCOM, General Ronald R. Fogleman, showed that, at any given time, only 85 of the C-141s are fully operational; of that 85, 15 are in the Air National Guard (ANG) and United States Air Force Reserve (USAFR) and ten are serving as trainers at Altus Air Force Base in Oklahoma.⁴¹ That leaves 60 mission-capable aircraft available for daily mission support. In time of war that figure reflects a capability well below that required in the MRS.

The C-5 fleet is also aging. Used for hauling outsized equipment, such as M1 tanks and patriot batteries, it is not flown interchangeably with the C-141, but used when outsized lift is required. There are 118 C-5s remaining in the inventory. This aircraft is extremely maintenance intensive and expensive to operate, yet it still averages just a 65% mission capable rate. Procured only twice--76 were purchased in 1970 and 50 were bought throughout the late 1980s-- the C-5 is programmed for replacement by the C-17 as it ages to retirement.⁴² The KC 10/135 tanker fleet is considered a strategic lift asset, but these aircraft are designed primarily for long-range refueling missions. They cannot haul outsized cargo and their strategic lift missions generally consist of assisting Air Force fighter wing deployments by hauling their unit equipment sets and providing the fighters their in-flight refueling.

For the past 25 years, the strategy for fixing the airlift shortfall has rested with the C-17. This aircraft, being produced by McDonnell Douglas Corporation, was originally designed to replace the aging C-141 and ultimately the C-5 by the year 2000. The approved acquisition plans, published in 1981, called for 210 aircraft at a total cost of \$37.5 billion. The need for the C-17 has been clearly substantiated in virtually every mobility study and exercise since the aircraft's design was approved. It hauls outsized equipment, lands on austere airfields, and combat off loads. This aircraft has the range, speed, aerial refueling, and payload of a C-5, while possessing the flexibility of the small tactical airlifter, the C-130-- survivability, short airfield takeoff and landing, and airdrop capability.⁴³

One analysis conducted by AMC in the aftermath of ODS used 80 notional C-17s to replace 117 C-141s that actually performed in ODS. The results were the total number of aircraft required was reduced by 37, while the C-17 increased the payload by 28 percent overall and by almost 50 percent during the first twelve days. Equally remarkable was that, within the theater, airlift requirements between unimproved airfields could have been accommodated by the C-17, eliminating 16 C-130s and providing an outsized intratheater equipment lift which was not available at the time.⁴⁴

There is no question that the C-17 represents a tremendous, and much needed, enhancement to current force projection capability. The C-17 program, however, has become so steeped in controversy that its acquisition program is likely to be curtailed. From the original buy of 210 in 1981, the Air Force cut back its

requirement to 120 aircraft in 1990. This was due, in part, to downsizing the force, but huge cost overruns and technical problems with the aircraft have also driven the acquisition number downward. The cost overruns have been so striking that Congress has actually limited acquisition to a total of 40 aircraft pending a Congressional review of the program in October 1995. Of the \$37.5 billion originally allocated for the production and procurement of 210 aircraft, \$21.3 billion will have been consumed to buy just 40 of them. This equates to a cost of \$534 million per aircraft.⁴⁵ GAO's recommendation to Congress in April 1994 was for DOD to establish a new, minimum number of C-17s needed to provide specialized airlift, while pursuing "a strategy to acquire nondevelopmental, wide-body aircraft to meet the additional airlift requirement."⁴⁶

The study of how much wartime strategic airlift is enough will ultimately be determined by cost. The need for fewer aircraft can be a simple function of later arrival dates with a greater assumed risk. In the meantime, AMC continues to support an unprecedented number of peacetime airlift missions with its aging C-141/C-5 fleet. The final FY 1994 figures show that AMC supported 67 separate deployments, an increase from 49 in FY 1993. AMC currently averages 140 daily missions in support of U.S. Armed Forces in 40 countries.⁴⁷

The passenger complement to DOD's military cargo capability is embodied in the CRAF. Established in 1951, the CRAF is a voluntary partnership program between DOD and the U.S. civilian airline industry. Carriers commit specific types of aircraft, crews, and infrastructure in return for favorable treatment in peacetime

lift of passengers and small cargo. The revenues these carriers generate through favored treatment, along with subsidies from DOD to modify and maintain long-range cargo aircraft, provide the incentive for enrollment in the program.

Aircraft committed to CRAF are called up in stages commensurate with levels of national emergency. Activation at Stage I is the responsibility of CINCUSTRANSCOM and is envisioned to take place to support early deploying contingency forces. Stage II activation is the responsibility of the SECDEF. Stage II activation would occur as a result of a security crisis, but one short of a declared national emergency. Stage III activation is also the responsibility of the SECDEF, but can only occur in the event that the President or Congress declares a national emergency.⁴⁸

Wartime CRAF activation has occurred only once, through Stage II, during ODS. CRAF proved to be a tremendous success in its first outing. CRAF aircraft hauled 70 percent of the passengers and 20 percent of the air cargo during ODS deployment. During redeployment, CRAF aircraft hauled 87 percent of the passengers and 43 percent of the air cargo. Probably most noteworthy was the CRAF's performance in the early days of ODS, where it flew 330 missions per month for the first two months. Overall performance throughout the conflict was equally impressive, in that CRAF's total contribution was to fly a full 20 percent of all the airlift missions in and out of the theater.⁴⁹

The CRAF Program proved its utility in the movement of passengers and small cargo during its debut performance. In peacetime, as well, CRAF saves DOD

money, infuses the civilian industry with needed capital, and, most important, keeps the U.S. private sector involved in the day-to-day readiness of DOD. CRAF, however, is not a panacea for all that ails the strategic airlift pillar. CRAF cannot haul outsized equipment. there is very little peacetime commercial utility for long range cargo haulers as evidenced by the demise of Pan American Airlines in 1991.⁵⁰ Small, palletized air cargo enjoys a robust commercial market, but commercial air cargo containers and handling equipment are not currently compatible with DOD's, which are designed to handle much heavier, bulkier cargo and vehicles. Also, commercial aircraft do not possess, nor do they require, the capability to land on unimproved airfields.

Other CRAF detractors include turbulence in enrollments due to its voluntary nature and a reluctance on the part of carriers to place their aircraft and crews in harm's way, especially since insurance and indemnity do not traditionally apply to acts of war. There is a further reluctance to enroll aircraft in the wake of ODS where carriers discovered that CRAF activation was a financially unsound proposition. The impact of the military drawdown on diminishing peacetime revenues collected by CRAF participants has also placed a damper on participation. As the military airlift fleet ages and degrades, the CRAF cannot bridge the widening gap. The CRAF, itself, will shrink commensurate with the drawdown of the military. This will worsen an already bad situation. The MRS determined that the airlift requirement to meet deployment timelines to one MRC was 57 million ton miles. The current AMC fleet with its complementing CRAF

can move 49 million ton miles. The MRS said that in order to meet the demands of one MRC, 210 CRAF wide-bodies would be required. There are currently 128 enrolled in the program.⁵¹

The airlift picture appears dismal. The sheer nature of the numbers seems to indicate that the United States is standing on the brink of losing its ability to provide unilateral, early response to crises around the world. There are, however, other ways to view this dilemma. "Early response" is a relative term. Timelines are sliding scales-- as the number of days for arrival increase, the number of aircraft required decreases. When forces need to arrive is a matter of subjective determination. Required arrival dates often have been determined historically by the amount of lift available and not the other way around. More important is the role airlift plays in the Nation's ability to respond unilaterally to crises around the globe. The United States no longer exercises control of a specific sphere of influence as it did in the bipolar world of the Cold War. It is unlikely that the United States would rapidly deploy combat forces without coalition consent and support. The need to maintain a unilateral strategic airlift capability may be as obsolete as it is financially untenable. Finally, there are other strategic mobility alternatives--one of the most formidable being sealift.

The Second Pillar--Sealift

Given the right fleet mix, sealift provides surge, sustainment and prepositioning. Along with the Navy's amphibious assault ships which put the Marines ashore,

sealift provides the bulk of DOD's force projection capability. There are a myriad of programs DOD uses to acquire the sealift it needs in the event of a crisis. The Military Sealift Command (MSC) is USTRANSCOM's sealift manager and draws from the following sources to fulfill requirements:

- U.S.-flag ships under charter (sustainment)
- Prepositioned ships (surge)
- Fast-sealift ships (surge)
- Contractual space on scheduled U.S.-flag ships (sustainment)
- Foreign flag charters (sustainment)
- Activation of the Ready Reserve Fleet (RRF)
(surge/sustainment)
- Ship requisitioning (sustainment).⁵²

The MRS was sensitive to these distinctions and recommended an ambitious sealift acquisition program. Most significant was the recommendation that DOD purchase 20 large, medium speed ROROs (LMSR), which could sustain a minimum of 24 knots. The MRS envisioned that nine of them would be dedicated to prepositioning and 11 would be maintained in the fast-sealift fleet.⁵³ This enhancement would ensure that the United States had a unilateral surge capability to respond quickly to crises. The MRS also recommended that DOD acquire 18 used LMSRs for sustainment shipping and place them in the Ready Reserve Force (RRF) to be called into service, as needed.⁵⁴

As previously discussed, the sealift shipping resources available to the United States during ODS were formidable. Vice Admiral Michael P. Kalleres, Commander, MSC, stated in 1994 that current plans are even more ambitious and require him to lift as many supplies and equipment in 52 days as were required for movement in the first 90 days of ODS.⁵⁵ The current sealift acquisition program is designed to meet the earlier arrival time line. The Navy awarded contracts for the first five LMSRs in July 1993. These initial-procurement ships will be conversions of commercial vessels. Two additional contracts were let in September 1993 for two new LMSRs with the option to buy ten more. The remaining ship requirements will be reviewed and purchased in 1998, if required.⁵⁶

In a marriage that seemed heaven made, Congress realized DOD's need for additional sealift in the aftermath of ODS and, in FY 1990, allocated \$2.1 billion for ship acquisitions--two years prior to the publication of the MRS.⁵⁷ It did not take long, however, for the marriage to dissolve. Prior to the first contract being awarded, GAO issued a report to Congress in July 1992 criticizing the Navy's proposed acquisition program. First, the GAO took the position that the Navy's requirement for a 24-knot sustainment speed was a capriciously determined design requirement, in that 22 and 23-knot vessels were commercially available and could easily be converted to military use. GAO contended that the slightly slower speeds generated one later arrival day to the farthest operating distance and, therefore, new ship construction was unwarranted. Second, GAO stated that the MRS made invalid assumptions on sail dates of current fleet assets, such as the FSSs, which

inflated the speed requirements for the new acquisitions. The result was that GAO believed the Navy could buy off-the-shelf vessels and save \$50 million.⁵⁸

Growing dissension within DOD was adding to the controversy. Navy critics of the Army's ambitious maritime prepositioning plan began raising concerns that excess sealift was being purchased at the expense of more vital requirements, such as amphibious ships to replace the aging amphibious fleet supporting the Marines. 'Apparently the argument had merit. The DOD Inspector General agreed with the Navy and, in early 1994, sent a report to the Secretary of Defense, charging that DOD may be wasting as much as \$793 million on sealift it did not need. The Inspector General recommended that steps be taken to validate maritime prepositioning requirements and that foreign governments contribute to sealift costs.⁵⁹

If the marriage between DOD and Congress was faltering, the jealous mistress, the Maritime Administration (MARAD), did not help. MARAD operates the RRF, which is programmed to grow from a fleet of 96 ships after ODS to a total of 140. MARAD is also responsible for ensuring that DOD ship acquisition programs do not have a negative commercial market effect.⁶⁰ Providing a badly needed expertise in support of DOD, e.g., interface with labor unions, ship yards, ships' managers, steamship companies, and merchant marine labor pools, MARAD also adds another voice to an already confusing and complicated discussion of what should constitute the military sealift acquisition strategy. Consequently, there are a number of competing agencies with an official or economic interest in

military sealift acquisition, which caused the first contract to be delayed three years. As General Rutherford told Congress on 23 February 1995, it will now take until 2001 to eliminate most of the shortfall. Additionally, the nine ships originally identified for prepositioning, reduced now to eight, are no longer programmed for purchase.⁶¹

While the Navy's sedentary acquisition cycle causes concern, it is being overshadowed by a rapidly shrinking U.S.-flag fleet, which is DOD's primary source for the bulk of its sealift ships and crews in the event of a major crisis. Though the Merchant Marine Act of 1936 allows the U.S. government to requisition the U.S. commercial fleet in a national emergency, that fleet has shrunk from 2,114 ships in 1947 to 247 with military utility in 1995.⁶² The U.S. commercial fleet is not generally competitive in world markets and requires protective legislation and subsidies to remain solvent. Current measures are not working, yet a badly needed Merchant Marine Reform Act failed to make it to the Senate in 1994. DOD has also shown reluctance to develop financial assistance programs to support the industry.⁶³ In spite of its decay, the U.S. commercial carriers are still designated as the primary source of sustainment shipping for DOD, though they were unable to meet the demands of ODS. Heavy reliance on foreign-flag carriers during ODS is one of the major reasons why the United States could not have acted unilaterally in SWA, should it have been deemed necessary.

The RRF exists, in part, to help mitigate this problem. Government owned and controlled, the 96 ships in the RRF provide an excellent potential source of sealift

capability. Unfortunately, most of these reserve vessels have no assigned crews and receive minimal maintenance. The MRS recognized the RRF's shortcomings and MARAD's subsequent inability to get ships activated within designated time lines during ODS. The study recommended that a new readiness category for selected RRF ships be created. Called the Reduced Operating Status (ROS) Program it is designed to keep selected ships on a four-day readiness string. These ships receive a high level of maintenance and are manned with full-time skeleton crews. The annual cost to maintain one ROS ship is over \$3 million, but they do provide DOD with a rapid response capability for both surge and sustainment operations.⁶⁴ Since the other ship activation categories, 5-to-10 day and 10-to-20 day have respective annual costs of \$2.8 million and \$2.4 million per ship, the ROS Program seems relatively cost effective.⁶⁵ The ROS Program has also proven itself worthy. It was activated for U.S. deployments to Haiti in Operation Restore Democracy in the Fall of 1994. MARAD was able to break out the fleet in one-quarter the time it took for ODS.⁶⁶ In spite of its success, however, Congressional budget cuts reduced the ROS Program in 1995 from 57 to 32 vessels.⁶⁷

The dramatic decrease of forward-deployed forces and the reduction of overseas basing rights have placed a greater burden on strategic sealift to provide the means for heavy forces to rapidly respond from CONUS ports. In spite of this increased burden, U.S. commercial sealift continues to be a dwindling resource, unable to muster the Federal support it needs to curtail its decline. Congress, as well, reduced the Navy's ship acquisition program and the RRF maintenance

program by \$158 million in 1994.⁶⁸ Sealift competes with Navy combatant and amphibious lift acquisition programs and, in light of current declining DOD budgets, sealift will sustain its share of the cuts.

Though a rapid resolution to the sealift shortfall does not seem to be forthcoming, the deliberate pace being set by the continuous debate in Congress over how much and what kind of sealift should be procured is warranted. For the time being, DOD appears to be moving in the right direction by focusing its efforts in the area of surge shipping--most notably in the area of prepositioning.

The Third Pillar--Prepositioning

Prior to the dissolution of the Soviet Union, the United States structured and arrayed its forces against a clearly defined threat with a clearly defined axis of advance--through the Fulda Gap into Western Germany. The response to this threat was a battle cry of "ten divisions in ten days," which reflected the U.S. commitment of Army forces to its European allies. The high level of certainty about threat capabilities and intentions allowed land basing of prepositioned sets of heavy equipment throughout temperature controlled warehouses in Central Europe to facilitate early arrival of CONUS-based units. Prepositioning gave the United States the transatlantic force projection capability it needed during the Cold War.⁶⁹

At the end of the Cold War, these European stockpiles, as well as others around the globe, were dismantled. The current war reserve strategy calls for

limiting stocks to support only the two MRCs, and land-based equipment sets are being relocated to SWA and Korea, accordingly. The loss of global war reserves gives the maritime prepositioned equipment added importance. Called “swing stocks” they can be moved quickly from one region to another, providing CINCs with early arriving combat power they otherwise would not have.⁷⁰ Both the MRS and the BUR recognized the need for additional maritime prepositioning to meet the various CINCs’ requirements during contingencies. The MRS recommended that an Army brigade, along with a port opening and logistics sustainment package, be added to the current maritime prepositioning program as a means of compensating for the loss of land-based war reserves.⁷¹

The tradition for maritime prepositioning began in the early 1980s when the maritime prepositioning ships (MPS) were created to rapidly deploy Marines to contingency areas. The 13 MPS ships were assigned to three geographic locations--in concert with the locations of the Marine Corps’s three Marine Expeditionary Brigades (MEB)--Guam, Diego Garcia, and the East Coast of the United States. Soon thereafter, eleven more ships were designated as the Afloat Prepositioning Squadron (APS) with the mission of carrying logistics for early arriving Army and Air Force units.⁷²

Highly flexible and capable of rapid response to most regions, the MPS and the APS were the first sealift-projected, U.S. presence to arrive in SWA at the beginning of ODS. APS supplies were also used during Operation Restore Hope in Somalia in 1994, proving maritime prepositioning has an OOTW utility and

increasing military commanders' confidence in it.⁷³ As Frank Weber, USTRANSCOM Deputy Director for Plans and Policy stated in March 1995, "The advantage of afloat prepositioning is that you have a set of equipment that can go multiple places. With equipment prepositioned ashore, if you guess wrong on where to put it, you will still require strategic sealift assets to get it to the right place."⁷⁴

The newest maritime prepositioning initiative is the Army's heavy brigade afloat, designed to provide heavy combat power capable of operating inland over extended LOCs. Unlike the MPS, which has 30 days of combat supplies and requires that the Marines do a linkup with a secure port and airfield for sustainment, the Army maritime prepositioning includes a substantial port opening package, 15 days of tactical logistics and a thirty day theater opening and sustainment package.⁷⁵ The Army brigade afloat was used during Operation Vigilant Warrior in October 1994, when it and 24th Infantry Division soldiers from Ft. Stewart, Georgia, accomplished a highly successful linkup in Saudi Arabia just days after being alerted.⁷⁶

Though the Army currently has only 40 percent of the two million square feet of sealift space the MRS recommended, small RRF ships have been substituted until LMSRs can be acquired.⁷⁷ Maritime prepositioning has proven it can play a critical role in the force projection capability of the United States through its contributions in ODS, Restore Hope, and Vigilant Warrior. The Army currently plans to increase its maritime force from its current fleet of 17 ships to 27. The

Marine Corps has validated a requirement to double the MPS from 13 ships to 26. Many of these vessel requirements were validated by the MRS and are already included in the Navy's ship acquisition program. However, because of the ongoing sealift debate, Congress has directed that total requirement be revalidated prior to acquisition in 1998. Assuming Congress approves the procurement, DOD will still be short eight vessels to meet its prepositioning objectives by 2001.⁷⁸

The Fourth Pillar--Infrastructure

Though it receives less attention than the other components of, infrastructure is a vital aspect of strategic mobility. Infrastructure moves and controls cargo and personnel through ports of embarkation, onto the strategic lift systems, and discharges and onward moves them at the ports of debarkation. Road, rail, and waterway networks that lead to and from ports, port staging facilities, materiel handling equipment, and inland shipping conveyances provide the physical aspects of infrastructure. Movement control and internal tracking and visibility systems are also components of infrastructure. When the various infrastructures are not matched to handle the size and volume of the lift assets they are programmed to process, successful strategic mobility cannot occur.

The Army's difficulty in projecting its maritime prepositioned supplies to Somalia during Operation Restore Hope, in 1992 and 1993, is illustrative of what happens when infrastructure is not adequately planned. On December 5, 1992, the decision was made to use the Army's supplies located on two of its maritime

prepositioned ships. The ships were instructed to sail from Diego Garcia to Mogadishu and arrived after a transit of four days. The draft of the vessels was too great to allow for discharge in the port. The ships, also designed to discharge barges while at anchorage outside the port (called "discharge in the stream"), found they could not unload their barges outside of the harbor's protected waters, either, due to heavy sea states.

One of the ships was ordered to Mombassa to trainload its cargo to another ship which had unloaded earlier in Mogadishu. The Mombassa Port Authority denied entry to the Diego Garcia ship on the grounds that it was too long and could not be accommodated. The other Diego Garcia ship had been ordered to go to Kismaayu to be unloaded, but sea states were too severe upon arrival. Both ships were then ordered to return to Diego Garcia where the plan was for them to download ammunition and ballast until they were light enough to get into Mogadishu Harbor. Upon arrival at Diego Garcia, the plan changed again and the supplies were transloaded to two other ships, one of which finally made it to Mogadishu on January 24, the other on February 15.⁷⁹ Failure to plan properly for inadequate infrastructure caused a two-month delay in bringing needed supplies and equipment ashore in Somalia.

Failure to program, regulate, and track the movement of people and equipment also causes unacceptable delays in strategic mobility operations. DOD's system for accomplishing this is called the Time Phased Force Deployment Data (TPFDD). Theater commanders with approved war plans have published TPFDDs

which dictate what units move and in what sequence they go. The TPFDD is currently the only document in the Joint Operations Planning System (JOPES) which authorizes USTRANSCOM to predict and program movement requirements. TPFDD development is an unwieldy, slow process. TPFDDs are normally turbulent, as well, because they are not restricted records and can be manipulated at several levels in JOPES, as commanders change their deployment desires. It has been estimated that TPFDD turbulence wasted as much as 20 percent of the airlift that flew to SWA during ODS.⁸⁰

Theater reception capability, particularly the ability to make inland distribution, more than any other aspect of infrastructure, dictates the operational tempo for strategic mobility operations. The current national security strategy makes it likely that DOD will continue to project forces to regions with under-developed transportation infrastructure, such as exists in Rwanda, Somalia, and Haiti. So serious is this concern that JCS has developed a Theater Logistics Support General Officer Steering Committee to evaluate necessary theater logistics systems, total asset visibility programs, and materiel distribution enhancements.⁸¹

CONCLUSIONS AND IMPLICATIONS

In April 1993, General Ronald R. Fogleman, then CINCUSTRANSCOM, testified to Congress that as a result of the Soviet Union's collapse, the strategic mobility planning process has become infinitely more complex. According to General Fogleman,

Threats to our interests can now come from any point on the globe, often unexpectedly and simultaneously. National priorities such as deficit reduction and domestic programs will limit the resources available for national defense, that will, in turn, cause substantial changes in our organizational structure, budget, and business methods.⁸²

Post Cold War uncertainty dictates that the United States be able to respond to a wide variety of contingencies across the threat spectrum. The shift from forward-based to power-projection forces has increased the need for strategic lift in spite of a rapid and substantial military drawdown. Add to this shift an increased involvement in OOTW and airlift support for United Nations operations, and the strategic lift requirement becomes even greater. Funding for acquisition programs to relieve the strategic lift shortfall, given a Congress which is driving large military budget reductions in light of a diminishing threat, is unlikely.

In 1992, the MRS determined that there was a strategic lift shortfall to support one MRC. The size of this shortfall was inflated because the MRS did not account for a declining force structure it could not envision. However, the C-17 will not be available at the turn of the century, either, as the MRS assumed. The addition of a

second, nearly-simultaneous MRC in the 1994 BUR pushed the MRS-based lift acquisition program out of tolerance. Though flawed, the strategic lift acquisition program recommended by the MRS continues to provide the current formula for procurements. It has been derailed in the area of airlift, however, due to the C-17, while sealift acquisition has been moved to a slow track. Maritime prepositioning initiatives are making progress, but there are potential infrastructure problems which jeopardize DOD's ability to successfully deploy its lift assets to undeveloped regions.

Both the BUR and the MRS are being updated in FY 1995 to recompute the strategic lift shortfall and to provide a revised acquisition strategy. Regardless of the final total buy, however, there will be a critical airlift shortage in the United States by 2001, as General Rutherford warned Congress in February 1995.⁸³ The revised numbers will undoubtedly reflect a smaller total requirement due to the drawdown of U.S. military forces since the MRS was originally published. Nonetheless, the current exorbitant cost of C-17s and modern, medium-speed ROROs will subject all new acquisition proposals to intense Congressional scrutiny.

The acquisition of sufficient strategic lift platforms has, in fact, become too expensive for the United States to continue its strategy of unilateral response. While possession of abundant strategic lift assets does provide that capability, it is unlikely that the United States will respond to regional instabilities without the backing and support of an alliance, given the current world order. The coalitions

the United States consults prior to taking military action are the same coalitions that rely on U.S. mobility assets. The United Nations and NATO are both heavily reliant on U.S. strategic airlift assets for their initial deployments and for sustainment. The Europeans have little organic military airlift capability; most other allies have none.⁸⁴

Airlift shortfalls are responsible for the bulk of the problem. Sealift is holding its own, in spite of controversy over how much sealift is enough. The U.S. Merchant Fleet is shrinking, but the various military fleets, FSSs, RRF, and charters are responsive, cost-effective programs which have given the United States the capability to rapidly project adequate heavy forces to meet current contingency requirements. In the event that the United States finds it must respond to two, nearly simultaneous MRCs, it will not, nor should it, execute those vast mobilizations unilaterally. Coalition shipping provided almost 30 percent of the sealift required for ODS. It will be called on to do so again, should it be needed.

Maritime prepositioning is a great success. Tremendous strides have been made in the Army maritime prepositioning program. It has grown to 17 ships, including a 30 day corps/theater SUSTAINMENT package, and will expand further pending revalidation by Congress. As the LMSRs are procured and added to the Army prepositioned fleet, the afloat package will be markedly enhanced with increase range, speed and shallow draft port access. The MPS and the APS have also proven their ability to provide early arriving forces. Enhancements for these

fleets are also forthcoming which will give them the same flexibility as the Army's prepositioning afloat.

The crumbling pillar is airlift. Unlike sealift, it is in the area of airlift where the United States has historically stood alone in its ability to move military cargo and personnel in large numbers around the globe. The current U.S. airlift fleet reflects its uniqueness by having responded to a record number of requirements, in support of multiple nations, since ODS. Overworked and facing obsolescence, it now needs to be replaced and the United States can no longer afford to do it. The solution to this problem demands a new approach.

First, there is a long-standing, U.S. tradition of selling military equipment to allies. Nations which share security interests with the United States need to be encouraged to buy the C-17. Germany, France, and Great Britain have all expressed interest in acquiring this aircraft. McDonnell Douglas has acknowledged that talks have been held with the French Government concerning possible developmental projects for cargo airlifters.⁸⁵ U.S. troop withdrawals from Europe provide the Europeans an opportunity to develop a distinctly European defense identity. This has been most notably manifested in the creation of the Allied Command Europe (ACE)'s new, multinational, rapid reaction corps. Called the ARRC, its mission is to rapidly respond to European threats which require force projection, such as might happen in Bosnia or Macedonia. Expected to be nominally operational by the end of 1995, it includes the U.S. 1st Armored Division, as well as units from the rest of NATO. Out-of-area deployments by the

ARRC would currently be heavily reliant on U.S. airlift to deploy and sustain its operations.⁸⁶ The European community needs to buy its share of the airlift that allows it to take its interests out of region.

The United States alliance with Japan also constitutes a source of untapped potential. The United States commitment to stability in Asia and specifically to MRC-West, Korea, is a coalition commitment in which the Japanese participate as a vital member. Unable to contribute offensively-poised combat forces, Japan possesses an array of defensive forces and provides the United States with logistics underpinnings which support its presence in the region. The United States currently has 3 depots in Japan, one of which, Sagami, currently has 5.1 million square feet of unused, open-storage space. Japan pays for the facilities and the civilian labor.⁸⁷ The possibilities for its use are endless. Serious consideration needs to be given to using this space to store war reserves to support both MRC-West, as well as humanitarian operations in other regions. The Japanese Government should be approached with the possibility of procuring C-17s and providing the airlift service for these war reserves.

Japan could also assume the United Nations airlift support mission currently being accomplished by the United States. The United States currently pays 31.7 percent of the United Nations peacekeeping bill. The Administration is committed to reducing that share to 25 percent by January 1, 1996.⁸⁸ In addition to financial burden-sharing, the Administration needs to pursue burden sharing of strategic lift

assets. Any savings generated by a reduced obligation to the United Nations should be spent on the C-17 Program.

The United States needs to buy as many C-17s as the budget will allow, in conjunction with whatever total requirement emerges from the revised MRS. As Dr. William Perry, Secretary of Defense, told Congress in February 1995,

...first of all you need a force that can get to the theater where you are going. And so I have maintained a view all along that the most critical issue for us right now is to have the strategic lift to get somewhere, that any time you're late it requires a larger force to deal with the problem than if you can get there early. And if you can get there as we did in that small example in the Gulf lately, before the fighting even starts, you have a good chance of suppressing the fight even before it starts.⁸⁹

In order to accomplish Dr. Perry's vision, it is apparent that the United States may need to trade some of its "punch" capability for more projection platforms. In conjunction with a renewed airlift analysis, DOD force planners need to adopt Dr. Perry's logic and look for combat system tradeoffs which could generate revenues for airlift acquisition.

Doctrine needs to be reviewed, as well, to find opportunities for smaller, lighter, and smarter weapons which can fulfill early arrival combat mission requirements and ease the strategic lift burden. If future enemies are less likely, over time, to have weapons systems comparable to the U.S. M-1 tank, then more tanks should be in land-based prepositioned sets where they are most likely to be

needed. The strategic lift requirement should be down-shifted to haul lighter weapons systems, accordingly.

In conjunction with relooking its force structure and doctrine, DOD needs to reconstruct its transportation management system. The TPFDD process in JOPES is unwieldy and causes wasted airlift. The current system needs to be dismantled. In its place a system needs to be developed which allows strategic lift managers to obtain better utilization of assets. The Rand Corporation has recommended the following actions:

- Involve transporters in close-hold planning
- Make planning factors more realistic
- Plan around optimization
- Rescript communications channels for efficiency
- USTRANSCOM needs rapid planning automation
- Establish redeployment offices
- Modernize MHE
- More aerial refueling of airlifters⁹⁰

Finally, the U.S. commercial sector must be a part of the solution. The United States leads the world in aviation research and development and aircraft production. Creative, innovative solutions are called for to resolve this dilemma. The NCA needs to pursue the establishment of a joint military-civilian commission to look at these issues and make recommendations for affordable, long-term

solutions which will get the United States the robust strategic mobility required to insure its national security.

END NOTES

¹ Paul Johnson, Book Review Essay, "The Myth of American Isolationism," Foreign Affairs, Vol. 74, No. 3, May/June 1995, p. 163.

² Carl E. Mundy, Jr., "Thunder and Lightning: Joint Littoral Warfare," Joint Forces Quarterly, Spring 1994, p. 45.

³ Sheila E. Widnall, Secretary of the Air Force, and General Ronald R. Fogleman, "Global Presence," Joint Forces Quarterly, Spring 1995, p. 95.

⁴ Ibid. p. 95

⁵ "A National Security Strategy of Engagement and Enlargement," The White House, July 1994, G.P.O. Washington D.C. p. 6.

⁶ John Shalikashvili, GEN, U.S. Army, (to) Senate Committee on Armed Services 9 February 1995, LEGIS-SLATE Report for the 104th Congress, dated 17 February 1995, pp. 4-6. See also Widnall and Fogleman, p. 94. Sullivan, Gordon R. and Twomey, Andrew B., "The Challenges of Peace," Proceedings, August 1994, p. 13. According to General Sullivan, in 1989, 32 percent of the active Army was stationed in Europe; by the end of 1994, the number was less than 16 percent; by 1999, it will be less than 14 percent: yet, the Army has experienced a 300 percent increase in missions since 1990.

⁷ Shalikashvili, p. 6. See also James Kitfield, "The Long Haul," Government Executive, (March 1995), p. 33. In 1994, AMC flew 69 deployments; in 1993, they flew 49; in 1992, they flew 27. They averaged 140 missions a day in support of troops deployed to 40 countries.

⁸ "Mobility Requirements Study (Volume I) Executive Summary," Department of Defense, 23 January 92, p. ES-1.

⁹ Bottom Up Review: A Brief to General Franks, presented by J-8, JCS, 13 February 1994, p. 8.

¹⁰ Les Aspin, Secretary of Defense, "Report on the Bottom Up Review," Department of Defense, October 1993, p. iii.

¹¹ Ibid, p. 19.

¹² Ibid.

¹³ Ibid, p. 20. The BUR states that the C-17 program is a problem and that the acquisition of "significant, modern, flexible airlift capacity is essential to our defense strategy."

¹⁴ William Matthews, "Lack of Lift Stymies War Plans," Army Times, 6 March 1995, p. 23.

¹⁵ Headquarters TRADOC Memorandum, "Views on the 1995-2010 Period," Paul J. Berenson, Scientific Advisor, 15 September 1994, p. 2. Retained at Hq, TRADOC. Copy available at the School of Advanced Military Studies or from monograph author.

¹⁶ Patrick Pexton, "More Divisions for Readiness, Says Report," Army Times, 13 March 1995, p. 19.

¹⁷ Matthews, p. 23.

¹⁸ Frank C. Conahan, "Military Airlift: The C-17 Proposed Settlement Program Update," GAO Testimony to the Armed Services Committee, House of Representatives, (28 April 1994), p. 3.

¹⁹ Matthews, p. 23.

²⁰ Lt. General William G. Pagonis with Jeffrey L. Cruikshank, Moving Mountains: Lessons in Leadership and Logistics from the Gulf War, (Harvard Business School Press, 1992), p. 6.

²¹ John Lund, Ruth Berg, Corrine Replogle, "Project AIR FORCE Analysis of the Air War in the Gulf: An Assessment of Strategic Airlift Operational Efficiency," Rand Project Air Force, (1993), p. 15.

²² Colonel Donn P. Kegel, "Improving the Civil Reserve Air Fleet (CRAF Program)," U.S. Army War College, Carlisle Barracks, (April 1993), p. 7.

²³ Pagonis and Crushank, p. 203.

²⁴ Peter Craig Laches, "An Analysis of the Mobility Requirements Study and the Future of Strategic Airlift," Naval Post Graduate School Monterey, (Mar 1993), p. 17.

²⁵ Laches, p. 10.

²⁶ Laches, p. 16. Total sealift tonnage hauled by category in percentages of total are: 22.6 by foreign charters, 22.0 by RRF, 10.2 by FSS, 3.7 by prepositioning, 5.2 by MPS, 21.2 SMESA, and 15.2 by U.S. charters.

²⁷ Lt. Col. Robert C. Dickerson, Jr., USMC, "What is the Right Strategic Sealift Mix to Deploy, Equip, Supply, and Sustain Contingency Forces?," The Industrial College of the Armed Forces, National Defense University, (April 1993), p. 15.

²⁸ The author deployed her battalion to Kuwait twice, once in 1993 and once in 1994, to provide logistics support for Intrinsic Action, a recurring, combined U.S./Kuwait training exercise, which utilizes this prepositioned equipment set. The funding for contractor maintenance of the equipment set is paid for by the Kuwaiti Government, as are the costs to maintain a U.S. area support group (ASG) in Doha, Kuwait.

²⁹ General H. Norman Schwarzkopf, It Doesn't Take a Hero, (Bantam Books, October 1992), p. 416.

³⁰ James Kitfield, "The Long Haul," Government Executive, Vol. 7, No. 3, (March 1995), p. 31.

³¹ Norman Rabkin, "Strategic Mobility: Serious Problems Remain in U.S. Deployment capabilities," GAO Testimony (to) House of Representatives, Committee on Armed Services, GAO, 26 March 1994, pp. 1-2.

³² Kitfield, p. 33.

³³ Army Field Manual 100-17, Mobilization, Deployment, Redeployment, Demobilization, Headquarters, Department of the Army, (28 October 1992), p. 4-3.

³⁴ John Boatman, "Can the U.S. Military Mount Two Simultaneous campaigns with its Airlift Assets?," Jane's Defence Weekly, International Edition, Vol. 21, No. 20, (21 May 1994), p. 18.

³⁵ Kitfield, pp. 33-34.

³⁶ Matthews, p. 23.

³⁷ Boatman, p. 17.

³⁸ Matthews, p. 23.

³⁹ Steven Watkins and Vago Muradian, "Pushing the Limits: Will Airlift Measures Wear Out the Force?," Air Force Times, (15 August 1994), p. 12.

⁴⁰ Matthews, p. 23.

⁴¹ Steven Watkins, "Backbone of Airlift Fleet is Badly Bent," Air Force Times, (15 August 1994), p. 12.

⁴² Watkins and Muradian, p. 12.

⁴³ "Air Mobility Command and the C-17," Defense Transportation Journal, September-October 1992, p. 18.

⁴⁴ Major Thomas Moore, "As Military Cuts Grow, So Does Dependence on Future Airlift," Transportation Corps, (July 1994), p. 26.

⁴⁵ Military Airlift: C-17 Settlement is not a Good Deal," GAO Report to Congressional Committees, GAO, (April 1994), p. 11.

⁴⁶ Conahan, p. 3.

⁴⁷ Kitfield, p. 34.

⁴⁸ Brooks L. Bash, Major, USAF, "CRAF: The Persian Gulf War and implications for the Future," Naval War College, Newport R.I., (9 June 1992), pp. 6-7. See also Sessoms and Maxson, p. 28. Current CRAF aircraft totals available for activation at each stage can be found in Kitfield, p. 33.

⁴⁹ Lt. Col. William H. Sessoms, USAF, and Lt. Col. Thomas J. Maxson, USAF, "Civil Reserve Air Fleet: Looking from Desert Storm to the Future," U.S. Army War College, Carlisle Barracks, (April 1992), p. 4, p. 20.

⁵⁰ Ibid, p. 48.

⁵¹ Kitfield, p. 34.

⁵² Laches, p. 3.

⁵³ "RORO Deal Awarded," Jane's Defence Weekly, 14 November 1992, p. 5.

⁵⁴ Martin M. Ferber, Director Naval Issues, GAO, "Shipbuilding: The Navy's Plan to Acquire Additional Strategic Sealift," Report to Congressional Committee on Armed Services, 30 July 1992, p. 9.

⁵⁵ Ernest Blazer, "Getting a grip on Sealift," Navy Times, 15 August 1994, p. 12.

⁵⁶ John M. Deutch, Undersecretary of Defense, Prepared Statement on Strategic Airlift and Sealift Programs, (to) U.S. Senate Committee on Armed Services, Congressional Record, (22 June 1993), p. 55.

⁵⁷ Ferber, p. 1.

⁵⁸ Ibid., pp. 7-9.

⁵⁹ "IG: DOD Spending \$800 Million for Sealift it Doesn't Need," Inside the Navy, vol. 7, no. 9, (28 February 1994), p. 1.

⁶⁰ General Robert R. Fogleman, CINCUSTRANSCOM, Testimony (before) the House Appropriations Committee, Congressional Record, (24 March 1994), p. 3.

⁶¹ Matthews, p. 23.

⁶² Kitfield, p. 35.

⁶³ Ibid. The House did pass a maritime-reform package, but it failed to make it to the Senate floor.

⁶⁴ Laches, p. 30.

⁶⁵ Ibid.

⁶⁶ Kitfield, p. 34.

⁶⁷ Ibid.

⁶⁸ Ibid. This budget reduction stretches the RORO acquisition schedule from its programmed completion date of 1998 to 2001, in addition to forcing MARAD to curtail its ships' maintenance programs.

⁶⁹ Lt. Gen. Gary H. Mears, J-4, JCS, and Ted Kim, "Logistics, the Way Ahead," Joint Forces Quarterly, Spring 1994, p. 42.

⁷⁰ Ibid.

⁷¹ Robert A. Chilcoat, "Army Prepositioning Afloat," Joint Forces Quarterly, Spring 1994, p. 51.

⁷² "Sealift--Does the United States Have Enough?", Asian Defence Journal, (July 1993), p. 46.

⁷³ Kitfield, p. 36.

⁷⁴ Ibid.

⁷⁵ Chilcoat and Henderson, p. 54.

⁷⁶ Kitfield, p. 36.

⁷⁷ Matthews, p. 33.

⁷⁸ John Glashow and Robert Holzer, "A Concept is Polished: Prepositioning deficiencies are Assessed, Then Corrected," Army Times, (1 May 1995), p. 26.

⁷⁹ David Kassing, Transporting the Army for Operation Restore Hope, Rand Arroyo Center, (1994), pp. 30-32.

⁸⁰ Lund, Berg, and Replogle, p. xiii.

⁸¹ Mears and Kim, p. 44.

⁸² General Ronald R. Fogleman, CINCUSTRANSCOM, "Hearings (Before the) Committee on Armed Services, U.S. Senate (April 1, 20, 22; May 19; June 17, 23 1993), Congressional Record, GAO, p. 416. General Fogleman became the Air Force Chief of Staff in August 1994.

⁸³ Watkins, p. 12. See also Matthews, p. 23. General Rutherford told Congress that it will take until 2006 to have all the airlift DOD requires to meet current war plans, assuming the C-17 program continues on track.

⁸⁴ Mark Stenhouse, "U.S.-European Relations in an Era of Transition," The Red Book, International Defense Review, (October 1994), Vol. 27, No. 10, p. 35.

⁸⁵ John Boatman, "C-17's European Tour Viewed by Three Nations," Jane's Defence Weekly, (25 June 1994), p. 5.

⁸⁶ Stenhouse, p. 38.

⁸⁷ The Model of Forward Presence and Theater Support Excellence," United States Army Japan, 9th TAACOM Mission Brief (for) Yama Sakura. Presented to Advanced Operational Art Studies Fellowship students and selected faculty, Kyushu, Japan, (January 1995).

⁸⁸ "The Clinton Administration's Policy on Reforming Multilateral Peace Operations," Dept. of State Publication 10161, Bureau of International Organization Affairs, (May 1994), p. 6.

⁸⁹ Dr. William Perry, SECDEF, and General John Shalikashvili, Chairman, JCS, Testimony to the House National Security Committee, Hearing on the DOD FY 1996 Budget, (8 February 1995), Legislate Report for the 104th Congress, p. 8.

⁹⁰ Lund, Berg, and Replogle, pp. 85-89.

BIBLIOGRAPHY

BOOKS

Chenoweth, Mary E., The Civil Reserve Air Fleet and Operation Desert Shield/Desert Storm: Issues for the Future, RAND Corp., Santa Monica, CA, 1993.

Conrad, Scott W. Moving the Force: Desert Storm and Beyond, National Defense University, McNair Paper 32, Washington D.C., December 1994.

Gough, Terrence J. U.S. Army Mobilization and Logistics in the Korean War, Center of Military History, Washington D.C., 1987.

Pagonis, William G. Lt. Gen. Moving Mountains: Lessons in Leadership and Logistics from the Gulf War, Boston, MA: Harvard Business School Press, 1992.

Kassing, David. Transporting the Army for Operation Restore Hope, RAND Corp., Santa Monica, CA, 1994.

Lund, John; Berg, Ruth; Replogle, Corrine. An Assessment of Strategic Airlift Operational Efficiency, RAND Corp., Santa Monica, CA, 1993.

Schwarzkopf, H. Norman. It Doesn't Take a Hero, New York: Bantam Books. 1992.

MONOGRAPHS, THESES, AND DISSERTATIONS

Bates, Basil B. Jr. Lt. Cdr., USN, U.S. Strategic Sealift Capability in 1994: Is It Ready for the Future?, Naval War College, 8 February 1994.

Bash, Brooks L. CRAF: The Persian Gulf War and Implications for the Future, Monograph, Naval War College, 19 June 1992.

Curates, William E. Jr. Lt. Cdr., USN, Strategic Sealift: Management of the Ready Reserve Fleet, Monograph, Newport RI: Naval War College, 13 February 1992.

Curtis, William, E. Jr. Lt. Cdr., USN, Strategic Sealift: Management of the Ready Reserve Force, Monograph, Newport, RI: Naval War College, 13 February 1992.

Evans, Carl D. Major, USAF, Maintaining Civil Reserve Air Fleet Participation, Newport RI: Naval War College, 22 February 1993.

Foy, J. Douglas Lt. Col. Strategic Sealift: Funding During a Period of Force Austerity and Fiscal Constraints, Monograph, Carlisle Barracks, PA: Army War College, 30 March 1992.

Heiter, Ronald P. Major, USA, Our Strategic Deployment System," Is It Structured to Support The Combatant Commander?, Monograph, Newport, RI: Naval War College, 8 February 1994.

Laches, Peter Craig, Thesis, An Analysis of the Mobility Requirements Study and the Future of Strategic Sealift, Monterey CA: Naval Post Graduate School, March 1993.

Keel, Donn P. Colonel. Improving the Civil Reserve Air Fleet (CRAF) Program, Monograph, Carlisle, PA: Army War College, no date.

Mayer, G. E. Lt. Cdr. USN, "Civil Reserve Air Fleet in Desert Shield/Desert Storm--A Measure of Future Effectiveness?, Newport, RI: Naval War College, 16 May 1994.

Olson, Donald C., Lt. Col. USA. The Civil Reserve Air Fleet...A Viable Strategic Airlift Asset in the Year 2000?, Ft. Leavenworth Ks: U.S. Army Command and General Staff College, School of Advanced Military Studies, 3 June 1992.

Scheidt, Barbara J., Lt. Cdr., USN, Thesis, A Force Structure Analysis of Strategic Sealift: How Much is Enough?, Ft. Leavenworth, KS: Command and General Staff College, 5 May 1994.

Sessoms, William H. Lt. Col., USAF, Civil Reserve Air Fleet: Looking from Desert Storm to the Future, Monograph, Carlisle Barracks: Army War College, January 1992.

Vanoekel, Hans J. Lt. Cdr., USN, Reorganization of the Ready Reserve Force--A Necessity to Implement the JCS Graduated Mobilization Response as Set Forth in the National Military Strategy for the 1990's, Monograph, Newport RI: Naval War College, 14 May 1992.

Willie, James F. Lt. Col., USA, The U.S. Strategic Mobility Posture--A Critical Factor to Support National Security Objectives, Monograph, Carlisle Barracks: Army War College, March 1992.

ARTICLES AND PERIODICALS

"Air Mobility Command and the C-17." Defense Transportation Journal, September-October 1992, pp. 16-18.

- Baker, Thomas M. Major. "As Military Cuts Grow So Does Dependence on Future Airlift!" Transportation Corps, Spring 1994, pp. 24-29.
- Beller, Margo D. "U.S. Short of Funds to Insure Private Planes in Wartime," Journal of Commerce, 28 July 1994, pp. 1 and 8.
- Blazar, Ernest. "Getting a Grip on Sealift," Navy Times, 15 August 1994, n. p.
- Boatman, John. "C-17's European Tour Viewed by 3 Nations," Jane's Defence Weekly, 25 June 1994, p. 5.
- Boatman, John. "Can the U.S. Military Mount Two Simultaneous Campaigns with its Airlift Assets?", Jane's Defence Weekly, 21 May 1994, Vol. 21 No. 20, p. 18.
- Boatman, John. "Interview with U.S. Air Force Chief of Staff General Ronald R. Fogleman," Jane's Defence Weekly, 10 September. 1994, p. 40.
- Boatman, John. "Interview with U.S. Air Force Secretary Sheila Widnall," Jane's Defence Weekly, 13 August 1994, p. 32.
- Boatman, John. "Joint Chiefs Agree that Strategic Lift is Lacking," Jane's Defence Weekly, 26 March 1994, p. 15.
- "C-17 Shortfall Threatens to Widen Looming US Airlift Gap," Jane's Defence Weekly, 21 May 1994, p. 18.
- Chilcoat, Robert A. and Henderson, David S. "Army Prepositioning Afloat," Joint Forces Quarterly, Spring 1994, pp. 51-57.
- Compart, Andrew. "Tensions Grow in Bosnia," Air Force Times, 22 August 1994, p. 10.
- Drake, Terrence R. "Expeditionary Airfields," Marine Corps Gazette, August 1994, pp. 37-39.
- "Draft Logistics Strategic Plan for Improvements in Mobility," Inside the Navy, 7 March 1994, n.p.
- Fogleman, Ronald R. "The State of Transportation Preparedness," As Reported in the CINCUSTRANSCOM Annual Report to Congress, April 1994, Defense Transportation Journal, August 1994.
- Glashow, Jason and Holzer, Robert. "A Concept is Polished: Prepositioning Deficiencies are Assessed, Then Corrected," Army Times, 1 May 1995, p. 26.

Gieringer, Mark, Major. "From the Top! An Interview with General Ronald R. Fogleman." The Mobility Forum, November-December 1993, pp. 21-26.

"IG: DOD Spending \$800 Million for Sealift It Doesn't Need," Inside the Navy, 28 February 1994, n.p.

Johnson, Paul, "The Myth of American Isolationism," A Review Essay, Foreign Affairs, May/June 1995, Vol. 74 No. 3, pp. 159-164.

Kang, Stephanie, "Hurricane? Famine? Call the Air Force," Air Force Times, 15 August 1994, p. 17.

Kitfield, James. "The Long Haul," Government Executive, Vol. 27 No. 3, March 1995, pp. 30-36.

Komodowski, Diane C. "Strategic Deployment System," TRANSLOG, April 1993, pp. 22-25.

Krepinevich, Andrew F. Jr. "Assessing the Bottom -Up Review." Joint Forces Quarterly, Winter 1993-94, pp. 22-24.

Miles, Donna. "Deploying America's Army," Soldier's Magazine, Vol. 49 No. 8, August 1994, pp. 24-27.

Moffett, George. "U.S. Debates Role in the World--Concert or Solo?," The Christian Science Monitor, 14 March 1995, p. 1.

Matthews, William. "Bottom -Up Review Misses Bottom Line," Army Times, 19 September 1994, p. 36.

Matthews, William. "Lack of Lift Stymies War Plans," Army Times, 6 March 1995, p. 23.

Mears, Gary H. and Kim, Ted. "Logistics: The Way Ahead," Joint Forces Quarterly, Spring 1994, pp. 39-43.

Mundy, Carl E. Jr. "Thunder and Lightning: Joint Littoral Warfare," Joint Forces Quarterly, Spring 1994, pp. 45-50.

Muradian, Vago. "Aerial Refueling is Key to Successful Airlift," Air Force Times, 15 August 1994, n.p.

Muradian, Vago. "Airlift is a Lot Like Candy," Air Force Times, 5 September 1994, p. 18.

Muradian, Vago. "A Tremendous Asset: Airlift Operation Gears Up for Another Commander," Air Force Times, 12 September 1994, p. 16.

Pasquarette, James F. and Foster, William G. "An Army Brigade Goes Afloat," Proceedings, May 1994, pp. 89-92.

Pexton, Patrick. "More Divisions for Readiness, Says Report," Army Times, 13 March 1995, p. 19.

"RORO Deal Awarded," Jane's Defence Weekly, 14 November 1992, p. 5.

"Sealift--Does the United States Have Enough?" Asian Defence Journal, July 1993, pp. 43-47.

Sherman, Rexford B. "Ports at War: Operation Desert Shield/Desert Storm," Defense Transportation Journal, April 1992, pp. 10-16.

Stenhouse, Mark. "U.S. Relations in an Era of Transition," The Red Book--International Defence Review, 1 October 1994, Vol. 27 No. 10, pp. 35-45.

"Strategic Deployment System," TRANSLOG, April 1993, pp. 22-25.

Sullivan, Gordon R. General, US Army. "Projecting Strategic Land Combat Power," Joint Forces Quarterly, Summer 1993, pp. 8-12.

Sullivan, Gordon R. General, US Army. "Ulysses S. Grant and America's Power-Projection Army," Military Review, January 1994, pp. 5-14.

Sullivan, Gordon R. and Twomey, Andrew B. "The Challenges of Peace," Parameters, Autumn 1994, pp. 4-17.

Tannenbaum, Miriam. "The Prepositioned Maintenance Facility," Ordnance, August 1994, pp. 22,23.

Tilelli, John H. Jr. Lt. Gen, US Army. "Force Projection: Essential to Army Doctrine," Military Review, January 1994, pp. 15-21.

Truver, Scott C. "Tomorrow's Fleet: Part II," Proceedings, July 1994, pp. 83-90.

"Two War Scenario in MRS Update Could Increase Lift Requirements," Inside the Navy, 17 January 1994, n.p.

"US Airlift and Sealift Assets 'Insufficient'," Jane's Defence Weekly, September 1993.

Watkins, Steven. "C-17 May Get Field Test in Rwanda," Army Times, 8 August 1994, p. 21.

Watkins, Steven and Muradian, Vago (and others). "Pushing the Limits: Will Airlift Missions Wear Out the Force?", Air Force Times, 15 August 1994, pp. 12-18.

Watkins, Steven. "Will C-17 Aid Rwandan Effort?", Air Force Times, 8 August 1994, p. 3.

Widnall, Sheila E. and Fogleman, Ronald R. "Global Presence," Joint Forces Quarterly, Spring 1995, No. 7, pp. 94-99.

MILITARY MANUALS, PUBLICATIONS, AND GOVERNMENT DOCUMENTS

Aspin, Les, Secretary of Defense, Report on the Bottom-Up Review, Washington D.C., October 1993.

The Clinton Administration's Policy on Reforming Multinational Peace Operations, Department of State, Bureau of International Organization Affairs, Washington D.C., May 1994.

Department of Defense, Mobility Requirements Study, JCS, Washington D.C., Volumes I-III (Secret), 23 January 1992.

Deutch, John. Testimony to the Senate Armed Services Committee on Strategic Airlift and Sealift Programs, Congressional Record, 22 June 1993, pp. 35-70.

Government Accounting Office. The C-17 Proposed Settlement and Program Update, U.S. GPO, Washington DC, 28 April 1994.

Government Accounting Office. The C-17 Aircraft Program: Improvements in Initial Provisioning Process, U.S. GPO, Washington DC, January 1994.

Government Accounting Office. Desert Shield/Storm Logistics: Observations by U.S. Military Personnel, U.S. GPO Washington D.C., November 1991.

Government Accounting Office. Operation Desert Storm: The Services Efforts to Provide Logistics Support for Selected Weapons Systems, U.S. GPO, Washington DC, September 1991.

Government Accounting Office. Report to Congressional Committees: Military Airlift--C-17 Settlement is not a Good Deal, U.S. GPO, Washington D.C., 15 April 1994.

Government Accounting Office. SHIPBUILDING: Navy's Plan to Acquire Additional Strategic Sealift, U.S. GPO, Washington D.C., 30 July 1992.

Government Accounting Office. Strategic Mobility--Serious Problems Remain in U.S. Deployment Capabilities, Testimony (to) The Subcommittee on Readiness, Committee on Armed Services, House of Representatives, Washington D.C., April 26, 1994.

Government Accounting Office. Strategic Sealift. Summary of Workshop on Crewing the Ready Reserve Force, Report to the Administrator, U.S. Maritime Administration, U.S. GPO, Washington D.C., June 1994.

Government Accounting Office. Strategic Airlift: Further Base Reductions in Europe Could Jeopardize Capability, U.S. GPO, Washington D.C., June 1994.

Groth, Carl H. Jr. and Berliner, Diane T. Peacetime Military Engagement: A Framework for Policy Criteria, Logistics Management Institute, Bethesda, MD, August 1993.

A National Security Strategy of Engagement and Enlargement, The White House, GPO, Washington D.C., July 1994.

Perry, William, Secretary of Defense, Testimony to Senate Armed Services Committee (1996 Budget, Part II of II), 8 February 1995, LEGI-SLATE Report for the 104th Congress.

Shalikashvili, John. Chairman, JCS, Testimony to Senate Armed Services Committee, 9 February 1995, LEGI-SLATE Report for the 104th Congress.

U.S. Army, Field Manual 100-17, Mobilization, Deployment, Redeployment, Demobilization, Washington DC: U.S. GPO, 28 October 1992.

OTHER SOURCES

Briefing Charts, "Bottom Up Review--A Brief to General Franks." (Prepared by J-8, JCS), 3 February 1994. Presented by Brig. Gen. Randall Rigby, Deputy Commandant, USCGSC, Ft. Leavenworth, KS, August 1994.